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Explaining the Link Between Income Inequality and Homicide Rates: A Cross-National Study

Harvey Krahn
Timothy F. Hartnagel
John W. Gartrell

Department of Sociology
The University of Alberta

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Population Research Laboratory, Department of Sociology,
University of Alberta, Edmonton, Alberta, T6G 2H4

EXPLAINING THE LINK BETWEEN INCOME INEQUALITY AND HOMICIDE RATES: A CROSS-NATIONAL STUDY

ABSTRACT

Previous studies have identified but failed to satisfactorily explain the positive relationship between income inequality and homicide rates. The criminological literature linking social inequality and crime is reviewed and four competing explanations are outlined, along with four alternative hypotheses which suggest that the relationship is spurious. Regression analyses demonstrate that, along with the positive effect of income inequality, population growth has a net positive effect which probably reflects a high proportion of young people in the population. Further analyses show that the effects of inequality on homicide are more pronounced in more densely populated countries, in more democratic nations and wealthier nations, and in countries with a larger internal security force. The theoretical implications of these findings and suggestions for future research are discussed.

Introduction

One of the more enduring explanations of criminal behaviour is that social inequality begets crime. This proposition underlies a long line of theories addressing inter-group differences in criminal behaviour (McDonald, Braithwaite). It also plays an important part in cross-national comparisons of crime rates. Specifically, a number of recent studies have identified a moderate size positive correlation between income inequality and homicide rates (Braithwaite, Braithwaite and Braithwaite, Hansmann and Quigley; Krohn a, McDonald, Messner, a,b). There appears to be a consensus that the incidence of homicide is higher in countries with greater income inequality. There is less agreement on exactly what this means.

It is frequently implied that this association reflects a cause-and-effect relationship, but theoretical explanations are seldom clearly outlined. In this paper, we turn to the large criminology literature addressing the linkages between social inequalities and crimes of various kinds, and extract four, albeit not mutually exclusive, theoretical explanations. As we shall see, these *absolute deprivation, relative deprivation, rational,* and *cultural* explanations cannot be directly tested since each is essentially an interpretation of the same observed correlation. However, examinations of the structural conditions under which the association of interest is either stronger or weaker allows us to compare the relative merits of the competing interpretations. Thus we can move towards a more complete sociological understanding of how social inequality affects homicide rates.

Alternatively, the association between income inequality and homicide rates might be spurious, a product of the systematic co-variation of these two variables with other social, demographic, or economic characteristics of nation-states. This possibility has been recognized in most previous cross-national studies of the relationship. But systematic discussions of the variety of possible spurious effects are less common than are somewhat arbitrary additions of several control variables to multiple regression equations. In order to consider the full range of control variables, we also draw from the literature a typology of alternative explanations. The *social disorganization, collective violence, population density,* and *age distribution* hypotheses all predict a

weakened or non-existent relationship between income inequality and homicide rates following the inclusion of appropriate control variables in the analysis.

While ordering and extending the theoretical debate in this area, we also address problems of method. In fact, one could argue that a third set of possible explanations of the observed inequality-homicide relationship involves methodological concerns. The composition of samples, and the reliability of both the homicide and inequality measures must be carefully examined before we address issues of model specification.

Inequality and Homicide: Previous Cross-National Research

Sampling

The association between national homicide rates and measures of income inequality has been reported in studies with sample sizes ranging from a low of 20 countries (Braithwaite) to a maximum of 50 (Messner, b). These are not really independent findings from a series of replications, since there has been considerable overlap in the cases examined. In addition, there has been enough across-study variation in the selection and measurement of control variables to severely handicap any attempts to generalize beyond the zero-order association between inequality and homicide. But even that correlation can be questioned because of the uncertain reliability of both measures.

Measurement Issues

The International Criminal Police Organization's (INTERPOL) annual crime statistics have provided homicide rate data for most studies in this area. [1] Despite the apparent consensus that this is the most reliable data source, Braithwaite and Braithwaite used a 20-year average from these data to reduce the problem of unreliable single year estimates. Other researchers have dropped specific cases because of their unusually high values (Krohn and Wellford, Braithwaite and Braithwaite; Messner, b). Messner (b) dealt with the problem of a skewed distribution by logging homicide rates. Thus, while homicide data are generally considered to be less error-prone than other crime

statistics, and while this particular source appears to be preferred for cross-national studies, these data must still be used with caution. [2]

There is less consensus over measures of income inequality. Braithwaite and Braithwaite examined nine different inequality measures before choosing intersectoral income inequality (estimates from Taylor and Hudson) because it was available for more cases. McDonald (148) and Krohn (a) also used this measure which does not adequately index the degree of income inequality across households. A measure of individual or household income inequality is more appropriate (Kuznets, Rubinson). Messner (a,b) used the Gini coefficient of household income inequality, obtaining his estimates in the first paper from Paukert and, in the second, from Jain who updated Paukert's work. [3] Many of the inequality estimates provided by Paukert and Jain were obtained in the mid- to late-1960s. Most users of these data have consequently tried to temporally match other data, including homicide rates, to these inequality data. With the exception of Messner (a) who drops some of the cases for which Paukert believed the data were suspect, the possibility of unreliable income distribution estimates, particularly in the less developed countries, has not really been considered.

Model Specification

Most of the cross-national studies of homicide rates have included some measure of a nation's productive capacity, usually GNP or GDP per capita, as a control variable. Braithwaite and Braithwaite also examined the effects of a GNP growth measure (1950 to 1965). An additional economic structure variable employed by Krohn (a) was the national rate of unemployment, while protein grams per capita (Braithwaite and Braithwaite) begins to index the general standard of living.

A variety of demographic control variables have also been examined in these studies. They include measures of population concentration (Braithwaite and Braithwaite), population size (Messner, a,b) and population density (Hansmann and Quigley; Messner, b). Both of these last two studies also considered the effects of urbanization, while Messner (b) added population growth (1960 to 1975) to his list of control variables. An age distribution measure was included by Hansmann and Quigley.

Messner's (b) measure of the percentage of the nation's youth enrolled in primary and secondary schools, intended to index "moral individualism", might also be considered an indirect measure of social control, as could the school enrollment variable used by McDonald. A more direct measure of the efforts of the state to control criminal behaviour might be the size of the police force, also used in McDonald's study. The effects of different political systems are considered by Braithwaite and Braithwaite, and social security spending was included by Braithwaite as a measure of societal welfare. Finally, several studies (McDonald, Braithwaite and Braithwaite, Messner, a,b, Hansmann and Quigley) have also controlled on the degree of ethnic (or linguistic or religious) fractionalization within the country.

In terms of sample size, number of control variables, use of an appropriate measure of inequality, and careful analysis, the studies by Messner (b) and Hansmann and Quigley are probably the best. Messner (b) finds a significant net effect of inequality on homicide, but little support for his Durkheimian model. He also reports a significant net effect of population growth, explaining that "perhaps rapid population growth is inherently destabilizing, or alternatively, perhaps it implies the presence of a relatively large number of young people" (236). Hansmann and Quigley, focusing on the link between population heterogeneity and homicide, also find a significant effect of income inequality (renamed "economic heterogeneity"). When an age distribution measure (percent of the population aged 15 to 24) is included in the multiple regression equation, it becomes the only significant predictor. Assuming that high population growth is associated with a high proportion of young people in the population, their study partially replicates the Messner (b) study. Other studies with smaller samples and different measures have identified a few other potentially important explanatory variables. Still, the most convincing results are these showing that homicide rates are higher in countries where inequality is higher and where there are relatively large numbers of young people. But few explanations of these empirical relationships are provided.

Inequality and Homicide: Theoretical Explanations

Examination of the large and diverse criminological literature in which social inequality and crime are linked allows us to identify four types of explanation. The sources of the explanations are, in some cases discussions of non-violent crime or discussions of individual and group differences rather than nation-state differences. Nevertheless, we believe that this typology largely encompasses the range of causal explanations of the inequality-homicide relationship.

Absolute deprivation explanations of crime focus upon the criminogenic conditions of life experienced by the poor and oppressed. Although numerous studies have attributed crime to poverty, the major theoretical elaboration of this theme has come from Marxist writers. While Marx himself had little to say about crime, both he and Engels emphasized that poverty was the result of the unequal distribution of wealth and power inherent in the private ownership of the means of production. Engels wrote about the disastrous social effects of poverty and the brutalization of the working class in capitalist societies. Hirst argues that Marx saw crime resulting from the demoralization and alienation found in capitalist society where large numbers of people were always unemployed or underemployed. Braithwaite calls this the oppression-aggression hypothesis. A somewhat different argument was put forward by Bonger in his book Criminality and Economic Conditions where he stated that capitalism has legitimized selfishness and developed egoism at the expense of altruism. As Braithwaite puts it "Cupidity and exploitativeness in interpersonal relations emerge in the capitalist transformation of work from its value for use to its value for exchange." (66) Thus, a simplified Marxist argument might propose that capitalism creates inequality, absolute poverty, and miserable living conditions which lead, in turn, to crime including homicide. In addition, the social relations engendered by capitalism have also been regarded as criminogenic.

The concept of *relative deprivation* emphasizes poverty in the midst of wealth as the critical explanatory factor. Merton, who wished to argue against the simple notion that poverty causes crime, incorporated this theme in his famous article "Social Structure and Anomie". He proposed that anomie and crime result from the inability to attain general societal goals because of socially structured differentials in access to

legitimate means. Messner (a) has applied this perspective to the relationship between income inequality and murder rates. He contends that the actual distribution of income in industrial societies is not compatible with their egalitarian value systems, and that this undermines general respect for social rules. Zehr's suggestion that persons frustrated by such relative deprivation will often direct their aggression against family and friends, rather than against the power structure, helps elaborate this thesis. The concept of relative deprivation has also been used by Gurr in an attempt to explain collective violence. A rapid widening of the gap between goal expectations and the ability to obtain them leads to widespread frustration, with rebellion or collective violence as a possible outcome. Rapid economic development could account for a rise in expectations relative to actual conditions, or recession without a corresponding lowering of expectations could also produce frustration and violence.

Rational crime explanations emphasize the intentionality of criminal acts. As Nettler notes, an important amount of crime simply represents attempts to achieve economic goals. Criminal means are chosen on the basis of a rational balancing of the anticipated rewards and costs of the crime. In the context of social inequality, the reward-cost ratio has been used to explain the greater criminality of the lower class. The poor commit more crime because the rewards of legitimate work are small compared to the rewards of crime, while the costs of dropping from their present condition to that of a convict are small (Braithwaite). Greater inequality would then represent a situation where such reward-cost ratios are relatively high. Such a perspective has, of course, most often been applied to property rather than to violent crime, although the deterrence literature has considered homicide (Bailey, Black and Orsaghi; Ehrlich).

A final type of explanation for the link between inequality and crime has a *cultural* focus. Sellin long ago suggested that culturally heterogenous societies may have higher crime rates because dominant group norms proscribe the behaviour valued by minority cultural groups. Thus cultural diversity may, by itself, lead to culture conflict and increased inter-group violence. Hansmann and Quigley also suggest that members of low status (or poor) groups may feel their opportunities for mobility are

especially restricted when higher status (or wealthy) groups are identifiably different from themselves. Their resulting frustration could lead to an unusually high incidence of within-group crime as a form of displaced aggression. Thus, the juxtaposition of cultural heterogeneity and income inequality may precipitate high homicide rates. [4]

The *absolute deprivation, relative deprivation, rational,* and *cultural* explanations are, of course, interpretations of the same association between income inequality and homicide rates. Choosing among them is not a simple task since our data describe nation-states rather than individuals. While one might find that countries with greater inequality have higher homicide rates, we do not really know if the poor are responsible and, if they are, we know nothing of their motivations. We can, however, see whether these four competing interpretations specify stronger or weaker associations between income inequality and homicide rates under different conditions. The degree to which the data fit these predictions provides us with one method of evaluating the competing causal explanations.

One version of the absolute deprivation explanation emphasizes the criminogenic effects of absolute impoverishment. Hence, we might predict that income inequality and homicide rates should be more strongly related in countries with lower standards of living, and thus more widespread absolute poverty. The other Marxist interpretation emphasized the self-serving attitudes produced within a capitalist mode of production. This suggests that a stronger association between inequality and homicide might be observed in societies where capitalist relations of production are more advanced.

The relative deprivation explanation suggests that in more democratic societies where both individual success and equality are valued income inequality should have a more pronounced effect on homicide. Blau and Blau, for example, hypothesize that socioeconomic inequalities associated with ascribed positions consolidate and reinforce ethnic and class differences and lead to pervasive conflict in a democracy. The alternative prediction might be that democratic traditions dilute the socially disruptive effects of income inequality since the (relatively) poor can still hope and vote for social change. An additional specification effect suggested by Gurr's relative deprivation arguments would be that inequality and homicide rates (an expression of collective

violence) would be more strongly associated in countries experiencing rapid economic change.

The rational crime perspective requires us to view homicide as rational behaviour. To the extent that this can be done, we might predict that in those countries with less well developed law enforcement and criminal justice systems, there would be a stronger relationship between inequality and homicide. This hypothesis runs counter to Marxist emphases on the development and enforcement of the law in capitalist societies (e.g., Quinney, b). Beginning with the premise that most laws are created and enforced to maintain unequal power relationships, it might follow that the relationship between inequality and homicide should be stronger where law enforcement agencies are more elaborate.

As already implied when introducing the cultural explanation, this perspective predicts a stronger association between income inequality and homicide rates in more culturally diverse countries. The argument, again, is that in such countries material inequalities mirror ethnic and racial cleavages and lead to higher rates of homicide.

All of these predicted specification effects derive from the four competing explanations of the inequality-homicide relationship. A final hypothesis of this type focuses on population density. Whether we explain the association between income inequality and homicide rates in terms of cultural diversity, absolute or relative deprivation, or in terms of rational motivations, we can still predict that the correlation would be stronger in countries with greater population density. High density can aggravate poor living conditions, highlight relative inequities, provide more opportunities for crime and, as Gillis notes, interact with cultural heterogeneity.

Inequality and Homicide: A Spurious Relationship?

These competing interpretations of the positive correlation between income inequality and homicide rates would be less important if the introduction of control variables substantially reduced or eliminated the statistical relationship in question. There is little point in interpreting spurious correlations. The four alternative hypotheses below suggest a variety of critical control variables.

The *social disorganization* explanation is based on the premise that rapid social change and the related processes of urbanization, industrialization and mobility are accompanied by a loosening of primary group controls over the individual. This weakening of social controls as traditional bonds of family, kin, and ethnic group lose their power to control conduct and as social relations become more impersonal and anonymous, results in higher rates of crime and violence (Scott and Zatz, Clinard and Abbott; Lodhi and Tilly). An elaboration of the social disorganization hypothesis notes that urbanization and industrialization are accompanied by an increasing heterogeneity of the population. This, in turn, generates or aggravates culture conflict and furthers a value relativism, with increased crime as a consequence (Brenner). Hansmann and Quigley have further suggested that informal social controls within a group may be weakened by contact with different cultures in a heterogenous society. Thus, this general perspective would predict that those countries experiencing rapid social change, in particular urbanization, economic development, and population growth, will also experience higher crime rates. However, while the available cross-national research has found some support for this hypothesis in the case of property crime, there is little good evidence linking social disorganization and homicide rates (Wellford; Krohn and Wellford; Wolf; Krohn, a,b).

A second alternative explanation emphasizes the effects of war and *collective violence*. Archer and Gartner, for example, explain postwar increases in homicide rates by suggesting that officially approved wartime killing and destruction provides a legitimation of violence, including a long-lasting reduction of the inhibitions against homicide. Hence, those countries which have a more violent history of warfare, riots and other forms of collective violence, particularly in their more recent past, should exhibit higher rates of homicide. On the other hand, a history of democratic politics might produce more tolerant attitudes and behaviours and, thus, lead to lower rates of homicide. Also, assuming an "imitation" or "legitimation" effect, large expenditures on security or defence forces may be associated with higher homicide rates.

A third alternative explanation, based in part on Calhoun's research on rats and on the writings of various ethologists (Ardrey; Lorenz; Morris), specifies *population*

density as a possible cause of crime. Direct relationships between density and delinquency and/or crime have been reported (Schmitt, Chilton; Schmid), and various suggestions have been made as to how density affects aggression and crime (Freedman). It has been hypothesized that density increases nervousness, suspicion, and stress, encourages anonymity and competition for scarce resources, and lowers inhibitions. Thus, in the context of our research, it is important to test the hypothesis that cross-national variation in homicide is more a function of varying levels of population density than of varying degrees of inequality.

Finally, it has become something of a criminological truism to note that criminal behaviour is more frequent among young people. This *age distribution* effect has sometimes been interpreted as a response to the maturational problems associated with adolescence (Bloch and Niederhoffer). Greenberg theorized that exclusion of juveniles from the world of adult work is a crucial structural source of adolescent crime since it simultaneously exaggerates dependence on peers for approval, and eliminates the possibility of obtaining funds to support leisure time social activities. He has also suggested that, in late adolescence and early adulthood, fear of the persistence of unemployment into adulthood "evokes anxiety over achievement of traditional male gender role expectations, especially among males in the lower levels of the working class, thus contributing to a high level of violence." (133-4). Such explanations may be relevant to the already noted higher homicide rates in nations with a larger proportion of adolescents and young adults in their population (Messner, b, Hansmann and Quigley). Nettler has argued similarly that the structure of modern societies encourages crime and delinquency among the young since these countries "lack institutional procedures for moving people smoothly from protected childhood to autonomous adulthood." (241). Accepting that educational institutions at least partially serve this function, we might further expect that crime rates would be lower in societies where a larger proportion of youth remained in school. [5]

Measurement

Homicide rates (per 100,000 population) for four time points (1960, 1965, 1971, and 1975) were obtained for nation-states providing data to INTERPOL and for

which income inequality data were also available. [1] An average homicide rate was also calculated, using as a base as many of the four time points as were available. This average increased the sample size (since some countries had data available for only two or three of the four time points). It also constituted a more reliable estimate. The homicide rates were examined for unusually high values. A single 1960 rate of 216 homicides per 100,000 population for Columbia was so extreme (compared to an average rate of 11.7 for the remaining 50 countries providing data for that year), that we dropped this country from the sample. All of the homicide rates, including the averages, were logged to deal with positively skewed distributions. Inter-correlations among the four single year rates ranged between .64 and .80, demonstrating an acceptable degree of over-time stability of measurement. The average homicide rate which we consider to be more reliable than the single year estimates is used throughout the hypothesis tests. [4]

Estimates of household income inequality (the Gini coefficient of income inequality) were obtained from Jain, with several additional estimates from Paukert, and from Bornschier and Ballmer-Cao. These data were also examined for unusually high or low values but, among the cases for which usable homicide data are available, none were found. [7] The final 1971 and 1975 samples (cases with both homicide and income inequality data) were of reasonable size (N = 47). The sample using the average homicide rate was substantially larger (N = 65), and thus represents a wider range of nations than did the samples used in previous studies. [8]

Additional control and specification variables from various sources were matched, as closely as possible, to the income inequality time points. Measures of social change and economic development (and, hence, of social disorganization) included: (log) GDP per capita (I.M.F.; U.N.), the percentage of the male labour force in agriculture, and the percentage employed in mining and manufacturing (Taylor and Hudson; I.L.O.), the percentage of the adult population that was literate, and the percentage of the population living in urban centres of 100,000 or more (Banks; U.N.), the divorce rate

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[1]Using the "wilful murder" category in the INTERPOL data, we were forced to choose 23 of the 205 rates (approximately 50 countries by four time points) for a year before, a year after, or an average of the two, rather than for these specific years.

(U.N.), the average annual (1960-70) GDP growth rate, and the average annual (1960-70) population growth rate (World Bank).

As noted in the review of previous research, the population growth variable may also indirectly measure age distribution (rapidly growing populations would contain more young people). Direct measures of age distribution (percentages aged 15 to 19, 20 to 24, 25 to 29, and 30 to 34) were obtained from U.N. sources. Chenery and Syrquin provided an estimate of the percentage of the 5 to 19 year old population enrolled in school, while population density values (people per square mile) were computed from population and land area data presented by Banks.

Collective violence measures included the average number of riots in five years and the average number of public protests in the same time period, defence expenditures as a percentage of GNP, and the size of the internal security force (per 1000 working age population), all from Taylor and Hudson. This last variable might also serve as a social control measure. An index of political democracy (Bollen), a measure of ethnic and linguistic fractionalization (Taylor and Hudson), and a measure of capital formation as a percentage of GDP (U.N.) to index the development of capitalist relations of production complete the list of additional variables

Results

Bivariate Associations

The zero-order correlations between income inequality and three homicide measures are positive and of moderate strength (Table 1). The strongest association (r = .479) is between the inequality measure and the 1975 rate while the weakest is based on the 1971 homicide rate (r = .263). The average homicide rate has a correlation of .315 with the Gini coefficient of household income inequality. The difference in strength of these associations demonstrates the extent to which sample sizes and different years' data can influence results, and suggests caution in interpreting previous studies with smaller samples. The differences also emphasize the importance of using multi-year estimates along with single year rates. '

Table 1: Cross-national correlates of homicide rates.

	Homicide rates (log)		
	1971	1975	Average[@]
Gini coefficient of household income inequality	.263 (47)	.479 (47)*	.315 (65)*
Measures of social change (and social disorganization)			
GDP per capita (log)	-.289 (51)*	-.147 (49)	-.367 (71)*
Average GDP growth (1960-70)	-.106 (42)	-.102 (44)	-.029 (61)
% male labour force in agriculture	.076 (48)	-.035 (47)	.197 (68)
% in mining and manufacturing	-.196 (48)	-.123 (47)	-.292 (68)*
% adult population literate	-.138 (51)	-.082 (49)	-.211 (70)*
Divorce rate	-.245 (32)	-.188 (35)	-.227 (44)
Population growth and age distribution measures			
Average population growth (1960-70)	.328 (52)*	.308 (50)*	.372 (72)*
% of population aged 15 to 19	.098 (48)	.277 (48)*	.145 (67)
% of population aged 20 to 24	.208 (48)	.041 (48)	.258 (67)*
% of population aged 25 to 29	.115 (48)	-.083 (48)	.224 (67)*
% of population aged 30 to 34	-.146 (48)	-.379 (48)*	-.103 (67)
% of 5-19 year-olds in school	-.407 (44)*	-.101 (44)	-.357 (63)*
Population density	-.094 (51)	-.044 (50)	-.118 (71)
Collective violence, security and democracy measures			
Number of public protests	-.259 (44)*	-.146 (42)	-.006 (63)
Number of riots	.036 (44)	.064 (42)	.043 (63)
Internal security forces	-.126 (46)	.001 (43)	.047 (64)
Defence expenditures (% of GNP)	-.305 (46)*	.009 (46)	-.208 (65)*
Democracy index	.034 (47)	.063 (47)	-.258 (66)*

[@] Average of homicide rates (per 100,000) from 1960, 1965, 1971, and 1975.

* Correlation coefficient is significantly larger than zero ($p < .05$). Sample sizes appear in parentheses.

Table 1 also displays the zero-order correlations between the variety of control variables and the several homicide rates. There is no support for the social disorganization explanation of cross-national variations in homicide rates. As reviewed above, this argument suggests that economic development and modernization lead to social disorganization, a breakdown of traditional social controls, and higher crime rates. However, the correlations between homicide rates and measures of industrial development, literacy, urbanization, divorce, and economic growth are either minute or in the direction opposite to that predicted. Contrary to this hypothesis, higher GDP per capita, economic growth, concentration in mining and manufacturing, and higher literacy, urbanization, and divorce rates are all associated with lower homicide rates.

There is, however, clear support for the predicted effect of population growth on homicide rates (r = .328 to .372). Societies experiencing rapid population growth have higher homicide rates, probably because of their larger proportion of young people. As shown in Table 1, larger percentages of the population in the age categories between 15 and 29 are associated with higher rates of homicide, while larger percentages in the 30 to 34 category are associated with lower rates. These data do not tell us, of course, whether the young or the old are committing the homicides although other research suggests it is the former.

The population density argument is not supported. Those countries with high density appear to have lower rather than higher homicide rates, although the correlations are small. Also, there is no support for the collective violence thesis. The correlations between the homicide rates and the measures of riots, protests, size of internal security forces, and defence expenditures are either very small or in the wrong direction. On the other hand, when considering the homicide rate average, we do find a moderate negative effect of democratic traditions. Homicide rates are lower in more democratic societies.

Summing up the bivariate results in Table 1, we can see that these findings resemble those of the more recent and better studies of the inequality-homicide association (Messner, b; Hansmann and Quigley). Homicide rates are higher in societies where income inequality is greater and where young people constitute a larger

proportion of the population. While support is found for the inequality and the age distribution predictions, we conclude that the social disorganization, collective violence, and population density predictions of direct effects are not supported. Only in the case of political democracy do we find an empirical relationship in the predicted direction which is large enough to warrant notice.

Multi-variate Analyses

Table 2 displays a series of multiple regression equations in which the 1971, 1975, and average homicide rates are the dependent variables. For each of these three dependent variables, we present first an equation with income inequality and population growth as the only predictor variables. These equations essentially replicate Messner's (b) final equation for a sample of 50 countries. Although the relative importance of the inequality and the population growth measures varies across the equations, the conclusion remains the same: both variables have net positive effects on rates of homicide. The equation using the average homicide rate, based on a substantially larger sample (N = 65) than used in any previous studies, shows appreciable net effects for both the Gini coefficient (beta = .225) and the population growth varible (beta = .397). [10]

In further exploratory analyses, all of the independent variables in Table 1 were included in a series of stepwise multiple regression analyses to see whether any had additional effects on homicide rates (controlling on inequality and population growth), or whether any suppressor effects were operating. Only a few additional findings were noteworthy. Reduced-form equations showing these additional effects were then calculated (Table 2).

GDP per capita has moderate net effects on the three homicide measures, controlling on the effects of inequality and population growth. Inclusion of this third independent variable did not, however, appreciably change the pattern of results or the amount of variance accounted for by the independent variables. Table 2 also displays equations containing the democracy index along with population growth and income inequality as predictor variables. While the zero-order association with the homicide

Table 2: Homicide rates, income inequality, population growth, economic development and democracy.

Independent Variable	Homicide rates (log) 1971				1975				Average@			
Population growth	.462*	.350*	.530*	.424*	.153	.175	.254	.276	.397*	.236	.344*	.272#
	.481	.356	.530	.430	.156	.176	.254	.276	.401	.237	.346	.273
	(.135)	(.174)	(.159)	(.174)	(.136)	(.175)	(.162)	(.183)	(.114)	(.143)	(.142)	(.155)
Income inequality	.189	.183	.164	.087	.424*	.478*	.438*	.447*	.225*	.201	.223#	.186
	2.25	2.03	1.81	0.97	4.67	5.12	4.66	4.75	2.41	2.07	2.30	1.92
	(1.55)	(1.57)	(1.53)	(1.62)	(1.53)	(1.56)	(1.50)	(1.56)	(1.21)	(1.22)	(1.24)	(1.28)
GDP per capita (log)		-.089		-.291		.147		.051		-.203		-.198
		-.078		-.259		.130		.046		-.168		-.162
		(.156)		(.182)		(.156)		(.169)		(.120		(.137)
Democracy index			.247	.380*			.300#	.284#			-.040	.038
			.008	.013			.011	.011			-.001	.001
			(.005)	(.006)			(.006)	(.006)			(.005)	(.005)
R^2	.28	.23	.27	.31	.25	.26	.31	.31	.25	.24	.23	.24
N	47	46	44	44	47	46	44	44	65	64	61	61

@ Average of homicide rates (per 100,000) from 1960, 1965, 1971, and 1975.

* Coefficient is significantly larger than zero ($p < .05$). The first entry in each cell is the standardized regression coefficient (beta), the second is the unstandardized coefficient (b), and the third is the standard error of the coefficient.

\# Coefficient is significantly larger than zero ($p < .10$).

average (r = -.258; Table 1) allowed the conclusion that more democratic societies have lower rates of homicide, the net effect of democracy in this equation is very small. The coefficients for the two single year homicide rate equations are now larger and positive in sign. Controlling on income inequality and population growth, more democratic societies have higher homicide rates. In addition, the effects of both inequality and population growth are increased when the democracy measure is added as a third independent variable. Since the zero-order associations between the democracy index and the single year dependent variables are small (.034 and .063), these suppressed effects suggest some kind of statistical interaction between democracy and the inequality and population growth variables in their effects on homicide rates. These effects are explored further in Table 3. Finally, Table 2 also presents equations where both GDP and democracy are included with the inequality and growth variables. Only small changes in the size of various coefficients are observed, leaving us with the conclusions drawn earlier: societies with greater income inequality and relatively more young people have higher rates of homicide; and democratic political systems may be a critical element in their (statistical) interactions with these two other factors.

Specification Effects

The inequality-homicide relationship remains in a larger, more representative sample, even with the inclusion of a wider variety of control variables. Hence, we can consider the various interpretations of this empirical relationship. As we suggested at the outset, aggregate data such as these allow only indirect tests of the validity of competing explanations. Examination of the conditions under which the inequality-homicide association is more pronounced is one way of making such assessments. Again, we focus on the magnitude of the effects rather than their statistical significance. Since our previous analyses have also demonstrated the importance of the demographic factor, the population growth variable is retained in our regression equations, although we do not present its coefficients in Table 3. In this table, eight pairs of multiple regression equations, each with the multi-year homicide average as the dependent variable and inequality and population growth as

Table 3: Effects of income inequality (controlling on population growth) on homicide rates under different conditions. @

Specification variable		b	standard error	r	R^2 #	N
GDP per capita:						
	≤ $300	1.208	1.575	.141	.131	32
	> $300	3.513	2.055	.302	.203	33
% of male labour force in agriculture:	≤ 47%	3.716	2.155	.298	.386	33
	> 47%	1.638	1.497	.229	.236	32
Capital formation as % of GDP:	≤ 18%	1.025	1.492	.180	.121	33
	> 18%	3.856	2.091	.332	.275	32
Political democracy index:	≤ 74	1.152	2.006	.098	.081	34
	> 74	3.753	1.426	.542	.399	31
GDP growth 1960-70						
	≤ 4.7%	1.919	1.782	.277	.195	29
	> 4.7%	2.651	1.694	.331	.254	36
Size of security force						
	≤ 2.8	0.975	1.822	.329	.308	33
	> 2.8	3.547	1.681	.339	.257	32
Ethnic fractionalization						
	≤ .49	3.075	1.637	.407	.295	33
	> .49	1.869	1.797	.199	.256	32
Population density						
	≤ 82	0.817 *	1.603	.185	.281	32
	> 82	5.224	1.841	.494	.331	33

@ The dependent variable in each equation is the average (log) of the homicide rates from 1960, 1965, 1971, and 1975.

In each equation, population growth is included as the second independent variable, although its coefficient is not shown. Hence, r represents the zero-order correlation between income inequality and the average homicide rate, while R^2 is the squared multiple correlation coefficient for an equation containing both independent variables.

* Difference between slopes is statistically significant ($p < .05$) in a one-tailed test.

predictor variables, are presented. Comparison of unstandardized regression coefficients (slopes) for income inequality, within each pair of equations, is the appropriate way to examine the hypotheses outlined earlier.

One hypothesis drawn from the absolute deprivation interpretation of inequality's positive effect on homicide rates was that the relationship should be stronger in poorer countries (with more widespread absolute poverty). Table 3 reveals that, in fact, effects are moderately larger (b = 3.51) in more developed countries (GDP per capita greater than $300 U.S.) than in less developed countries (b = 1.21). A second specification hypothesis based on the absolute deprivation argument focused on the exploitative character of capitalist relations of production. Stronger effects of inequality on homicide were predicted in more advanced capitalist societies. We have used measures of capital formation as a percentage of GDP and the percentage of the male labour force in agriculture as crude direct and inverse measures, respectively, of the degree of capitalist development. The differences in slopes are in the predicted direction. We see moderately stronger effects of inequality on homicide in societies with fewer people employed in agriculture and in societies with higher rates of capital accumulation.

Relative deprivation interpretations of the inequality-homicide relationship also suggested several specification hypotheses. One of the predictions implied by this form of argument was that of a larger effect of inequality on homicide in more democratic societies. The multiple regression results hinted at such differences, and the equations in Table 3 provide further clarification. The difference between the two slopes (3.75 versus 1.15) is again of moderate size. Income inequality has a more pronounced effect on homicide in more democratic societies. There is at least some support for the argument that the combination of income inequality and political democracy may lead to conflict and expressions of inter-personal violence. The counter argument that democratic traditions may "dilute" the effects of inequality on homicide is not supported. A second hypothesis drawn from the relative deprivation argument was that in countries experiencing rapid economic change, the divergence between expectations and actual conditions could lead to violence. The effect on inequality on homicide is

greater in countries experiencing greater economic growth (b = 2.65 versus 1.92) but the difference is really too small to consider as support for this hypothesis.

The rational crime interpretation led us to the social control hypothesis that in societies with larger law enforcement systems, inequality would not have as strong an effect on homicide. Table 3 reveals a difference in slopes that is in the opposite direction to that predicted. In countries with relatively large internal security forces, inequality has a larger effect on homicide. This observation is in line with the Marxist criminologists' premise that law enforcement systems are used to maintain unequal distributions of wealth and power. More specifically, we may be seeing evidence here of the inclusion in the sample of Central American and other developing countries where high inequality, extensive poverty, and widespread violence and state repression are inter-related facts of life.

Another specification hypothesis outlined earlier was based on a cultural explanation of the inequality-homicide association. While we predicted stronger effects in situations of cultural heterogeneity, we find, in fact, a stronger effect of inequality on homicide in societies with less cultural diversity (b = 3.08 versus 1.87). Thus, we fail to find evidence that cultural heterogeneity interacting with income inequality encourages expressions of inter-personal violence, at least in the case of homicide.

The most pronounced difference between slopes in Table 3 is found when we compare countries with low and high population densities. In countries where population density was greater than 82 persons per square mile, the effect of inequality on homicide was very much greater (b = 5.224) than in low density countries (b = .817). As we suggested earlier, high population density may accent the inequality-homicide relationship, no matter how it is explained. For example, we find some support for the relative deprivation explanation - the combination of high income inequality and a democratic ideology appears to lead to increased rates of homicide. High population density might well aggravate such a situation by making distinctions between rich and poor more visible.

Summary and Conclusions

A positive association between income inequality and national homicide rates has been observed in a number of previous studies. But small sample sizes, varying degrees of concern about measurement problems, and a somewhat casual approach to the inclusion of control variables has not allowed a great deal of confidence in this finding. More importantly, researchers in this area have not satisfactorily explained the statistical association. In this paper, we have reviewed the criminological literature linking social inequality and crime of various kinds, and have identified four competing explanations of why greater inequality in the distribution of income might affect homicide rates. We have also extracted from this literature four alternative hypotheses which essentially suggest that the association is spurious.

Using a substantially larger sample of nation-states than previously employed, we found, as expected, a moderate-size positive correlation between income inequality and rates of homicide. We also found, as have several other recent studies, that population growth (or a large proportion of young people in the population) was associated with higher homicide rates. Bivariate analyses provided no support (since the correlations were negative rather than positive as predicted) for the social disorganization, collective violence, or population density predictions of direct effects on homicide rates. Non-findings often tend to be viewed as unimportant. But we believe that this presentation of unsupported hypotheses is a valuable contribution to this research literature. It is evident that, contrary to predictions, some of these factors do not lead directly to increased rates of homicide. Having demonstrated this, we can ignore these factors and concentrate on others.

Inclusion of control variables in our regression analyses did not substantially reduce the positive association between homicide rates and income inequality. Only population growth maintained a significant net effect, controlling on income inequality. In brief, higher rates of homicide are found in countries where income is distributed more unequally, and where population growth has been very rapid. In addition, these analyses also hinted at an interaction effect operating between inequality, population growth, and a measure of democratic traditions.

Our method of evaluating competing explanations of the inequality-homicide relationship involved the testing of specification effects suggested by each of the four interpretations. One variety of absolute deprivation arguments suggested a stronger association between homicide and inequality in poorer countries, but the data contradicted this hypothesis. Marxist criminologists' prediction of a stronger effect in more advanced capitalist societies received some support. Marxist/conflict theory writers have also suggested that law enforcement agencies serve primarily to maintain societal inequalities. The somewhat stronger effect of inequality on homicide in countries with larger internal security forces is in line with such an argument, but in opposition to a rational crime interpretation of the inequality-homicide correlation.

The relative deprivation explanation suggested that income inequality might generate more violent behaviour in more democratic societies because of the co-existence of high material inequality and an egalitarian value system. This prediction also received moderate support in the specification analyses. Finally, we argued for and found strong evidence of a stronger effect of inequality on homicide in more densely populated countries. While population density does not have a direct effect on homicide rates, it certainly appears to condition the effect of income inequality.

In sum, our analyses allow greater confidence in the inequality-homicide correlation, identify population growth as a second critical variable while eliminating a variety of alternative hypotheses, and specify some of the conditions under which violent behaviour is more likely to be generated by an uneven distribution of income. Specifically, the effects of income inequality on homicide rates are larger when the population is dense, in more advanced capitalist societies, in more democratic societies, in countries with a larger internal security force, and in wealthier countries. These findings offer some support for the relative deprivation explanation (the democracy-inequality interaction effect). They also highlight the particular importance of population density in specifying the inequality-homicide relationship. However, the results support only one form of the absolute deprivation explanation. Inequality does not have larger effects on homicide in poorer countries. Instead, its effects are larger in the wealthier, more economically developed nations. The second absolute deprivation

type of argument predicted this outcome but emphasized capitalist relations of production rather than societal wealth as the causal factor. Our finding of a larger effect of inequality on homicide in countries with more pronounced capitalist relations of production supports such an argument, but may also reflect the fact that democratic political systems are more likely to be found in wealthy, capitalist nations. An emphasis on political democracy is, of course, the basis of the relative deprivation explanation we have already discussed. Future research might address itself to separating the impacts of these correlated specification variables, perhaps through an examination of higher-order interaction effects.

Future research might also take several other courses. Population density appears to strongly influence our results. Various researchers (Galle et al.; Gillis; Gillis and Hagan) have emphasized the need to distinguish between different types of population density since each may have different effects on criminal behaviour. But much of this research has not considered cross-national differences in crime or density. Further interactions between density and cultural heterogeneity or age distribution measures, for example, could also be fruitfully pursued.

While we have largely ignored it in our discussion, the association between homicide rates and population growth deserves equally detailed attention. Why does a young population lead to higher rates of homicide? Greenberg, for example, claims the phenomenon of high youth crime rates is a fairly recent development in industrialized capitalist countries, and that comparatively few crimes are committed by young people in the less developed nations (Christiansen; Toby). This suggests that the relationship between age distribution and homicide measures should be accented in more industrialized societies, and points to another series of specification effects worthy of examination.

Finally, while we recognize that longitudinal research is suggested much more frequently than it is undertaken, it is important to look at over-time changes in homicide rates within countries. A number of the explanations we have considered in this paper actually refer to processes of change within countries (e.g. population growth, GNP growth) and so such analyses are essential. They could increase our

understanding of the obviously complex interrelationships among inequality, homicide, population growth and density, and democratic traditions.

Footnotes

1 INTERPOL homicide rates are used by Krohn (a), McDonald, Braithwaite and Braithwaite, and Messner (a,b). Wellford, Krohn and Wellford, and Hartnagel have also used INTERPOL data in their studies which did not focus on the effects of income inequality. Hansmann and Quigley do include income income inequality in their analysis and appear to have used INTERPOL data, although they do not report their source.

2 Alternative data, used by Quinney (a) but few others, are available in the World Health Organization's "cause of death" statistics. In most countries these data would not be obtained from the same institutional sources providing data to INTERPOL. Thus they become useful independent estimates, even though they are available for fewer countries. Wellford suggests that the two sources provide similar estimates and Vigderhaus presents a correlation of .95 between the two sources for a small sample of 33 countries.

3 Hansmann and Quigley may have used Paukert's collection of inequality estimates but, again, do not report their data source.

4 Cultural explanations of violent crime are incomplete without reference to Wolfgang and Ferracuti's sub-culture of violence thesis. They argue that higher rates of violent crime are the product of wide-spread values justifying violent behaviour. Unfortunately, cross-national data on the distribution of such values are not available, making testing of this argument impossible.

5 There is, of course, an alternative position which proposes that much youth crime is a response of working class youth to their enforced presence in middle class schools. The necessary cross-national data to test such an hypothesis (the proportion of working class children enrolled in schools) is simply not available.

6 The 1971 and the 1975 rates are also used in the earlier analyses, as a check on the degree to which results change due to sample differences. Although our analyses are based on INTERPOL homicide data, we also examined World Health Organization (W.H.O.) "cause of death" statistics for the same years, using their "homicide and injury purposely inflicted by other persons (not in war)" category. Our choice of INTERPOL data was based on the larger sample they provided and on the rather apparent omission of less developed countries in the W.H.O. data. This under-representation of poorer countries may explain why we found over-time measurement stability to be somewhat higher for the W.H.O. homicide rates (correlations between .89 and .98). Inter-source correlations were highest for 1975 ($r = .73$) and about .50 for the three earlier time-points, suggesting that the two homicide data sources should probably not be merged for analyses focusing on the 1960s and early 1970s.

7 An additional analysis of the inequality-homicide relationship (controlling on population growth), based on a reduced sample from which six cases had been dropped because of questionable inequality data, led to no important changes in our conclusions.

8 We recognize that this sample is not randomly selected and that significance tests are not really appropriate for purposes of inference to the population of all nations. They can, however, be seen as indices of measurement error and so may still be useful for distinguishing important from unimportant effects. In our analyses, we report but do not strictly emphasize tests of significance.

9 Further analyses (results not shown) demonstrated that the relationship between income inequality and homicide rates was linear. A disaggregation of the relationship also showed that smaller shares of total income received by the lowest four quintiles of households were associated with higher homicide rates as were larger shares of income received by the top twenty percent of households.

10 We argued earlier that the population growth measure also taps age distribution effects which may represent the real underlying cause. In further analyses (results not

shown) we examined multiple regression equations in which the percentage of the population aged 15 to 19, and the percentage aged 30 to 34 replaced the growth variable. Again, coefficients varied across the equations but it was clearly apparent that our interpretation found support. Higher proportions of very young adults were associated with higher homicide rates while higher proportions of those aged 30 to 34 were associated with reductions in homicide rates, controlling on the relatively unchanged effects of income inequality. In the interests of simplicity, a single measure (population growth) is used in the regression equations we present.

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